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Report to Congressional Requesters

July 1997

STUDENT FINANCIAL AID INFORMATION

Systems Architecture Needed to Improve Programs' Efficiency

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The Honorable James M. Jeffords
Chairman, Committee on Labor and Human Resources
United States Senate

The Honorable William F. Goodling
Chairman, Committee on Education and the Workforce
House of Representatives

The Honorable Howard McKeon
Chairman, Subcommittee on Postsecondary Education,
Training and Life-Long Learning
Committee on Education and the Workforce
House of Representatives

As requested, we are reporting to you on the Department of Education's National Student Loan Data System (NSLDS). This national database on title IV (student financial aid) programs[1] is designed to track loan and grant data, provide a research database, and support functions such as prescreening of aid applicants for eligibility and student enrollment status. Because of concerns surrounding the Department's ability to improve the reliability and efficiency of student financial aid information and delivery systems, you asked that we assess its progress toward integrating NSLDS with other student financial aid databases, as required by law. Appendix I describes our objective, scope, and methodology in more detail.

Results in Brief

The Department of Education has made limited progress in integrating NSLDS with the other student financial aid databases that support title IV programs. Neither NSLDS nor the other systems were designed for efficient access to reliable student financial aid information. Many of the systems are incompatible and lack data standards and common identifiers. Inhibiting movement toward a fully functional, real-time, integrated system is the absence of a systems architecture—a structure for effectively incorporating major systems development into an existing information systems environment. The Department to date has not devoted the time or effort necessary to develop such an architecture; hence, its past and current systems development activities have no single, guiding framework.

[1]Title IV of the Higher Education Act of 1965, as amended. These programs make billions of dollars in loans and grants available to postsecondary education students each year.

Without a systems architecture and the ability to easily integrate its systems, the Department continues to acquire independent systems to support specific student financial aid programs—programs that cannot easily share information. Accordingly, the cost of developing and maintaining these stand-alone systems continues to mount. While developing such stand-alone systems has served immediate program needs on a limited basis, this approach undermines the goal of sharing student financial aid information across programs.

Background

The Department of Education's Office of Postsecondary Education (OPE) administers student financial aid programs under title IV of the Higher Education Act of 1965, as amended (HEA). Through these programs, students have access to billions of dollars in loans and grants for postsecondary education each year. Four major types of student aid are currently in use: the Federal Family Education Loan Program (FFELP),[2] the William D. Ford Federal Direct Loan Program (FDLP), the Federal Pell Grant Program, and campus-based programs.[3] These programs together will make available more than $47 billion to about 8 million students during the 1998-99 academic year—about 80 percent of it in student loans.

Prior to the 5-year phase-in of FDLP, the two largest postsecondary student aid programs were FFELP and the Pell Grant Program. FFELP provides student loans, through private lending institutions, that are guaranteed against default by approximately 36 guaranty agencies[4] and insured by the federal government. The Pell Grant Program provides grants to economically disadvantaged students.

Over the years, both FFELP and the Pell Grant Program have encountered waste, fraud, and abuse. The structure of FFELP creates the potential for large losses due to abuse, given the limited financial risks for program participants—schools, lenders, and guaranty agencies—as well as the unreliable student aid data generally provided by guaranty agencies. In fiscal year 1995, the federal government paid out over $2.5 billion to make good its guarantee on defaulted student loans. The Pell program has also

[2]FFELP was formerly the Guaranteed and Stafford Student Loan programs.

[3]The campus-based programs include the Federal Work-Study Program, the Federal Perkins Loan Program, and the Federal Supplemental Educational Opportunity Grant Program.

[4]State and private nonprofit guaranty agencies act as agents of the federal government, providing a variety of services, including payment of defaulted claims, collection of some defaulted loans, default-avoidance activities, and counseling to schools and students.

experienced abuse, such as students' receiving grants while attending two or more schools concurrently.

As we recently reported,[5] the Department's loan programs continue to be at risk for waste, fraud, and abuse. The Department has not yet succeeded in protecting the financial interests of taxpayers and has not resolved long-standing management problems. For example, inadequate Department oversight contributed to abuses on the part of some schools participating in federal student aid programs. These abuses include instances in which schools received Pell grant funds for ineligible students.

In addition, the Department's data quality and management controls are inadequate. For example, because poor quality and unreliable FFELP student loan data remain in the Department's systems, Education staff cannot obtain complete, accurate, and reliable FFELP data necessary for reporting on its financial position. The Department's Office of Inspector General was unable to express an opinion on its fiscal year 1994 FFELP principal financial statements, taken as a whole, because student loan data on which the Department based its expected costs incurred on outstanding guaranteed loans were not reliable. For the same reason, Education received a disclaimer of audit opinion on the 1995 financial statements. The Department's chief financial officer, in Education's March 1997 annual accountability report (covering fiscal year 1996), presents unaudited 1996 financial statements, and says that the audited statements—with auditor's report—should be available about July 31, 1997.

In 1986 and 1992, the Congress tried to help overcome these long-standing problems. In reauthorizing the title IV programs, the HEA amendments of 1986 authorized the Secretary of Education to establish NSLDS to ensure accurate information on student loan indebtedness and institutional lending practices, and to improve compliance with repayment and loan-limitation provisions. Because the 1986 amendments contained a provision that the Department could not require guaranty agencies to use the system before guaranteeing new loans, the system was not developed. The 1989 Budget Reconciliation Act, however, allowed the Department to require guaranty agencies to use such a system before approving new loans. The 1992 reauthorization amendments expanded the scope of NSLDS by requiring the Department to integrate NSLDS with databases of the other title IV systems. The 1992 amendments also stated that NSLDS should allow

[5]High-Risk Series: Student Financial Aid (GAO/HR-97-11, February 1997).

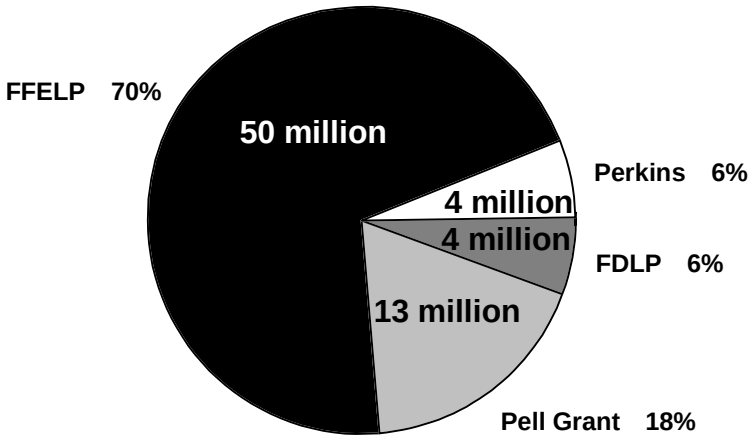
for the monitoring of information on student enrollment status, current loan holders and servicers, and internship and residency status. They also said that borrowers should be able to use the system to identify current loan holders and servicers.

In response to these legislative mandates, in January 1993 the Department awarded a 5-year, $39-million contract for development and maintenance of NSLDS. The system was aimed at providing information on students across programmatic boundaries. Loan information was to be transmitted to NSLDS on a regular basis by schools, guaranty agencies, and other Departmental databases. In so doing, Education hoped that NSLDS would serve the needs of students and schools, as well as guaranty agencies and the Department. It was planned to be used to assist in determining students' aid eligibility throughout repayment periods and also serve as an overall financial aid history file on program participants.

Education also anticipated that NSLDS would enable it to help reduce the number of loans given to ineligible students. A student in default on any previous student loan is generally ineligible to receive additional federal aid until the default is resolved. Education planned for NSLDS to identify ineligible applicants by checking for defaults on previous student loans. The ability to check that cumulative loan limits were not exceeded was also envisioned for NSLDS, along with verification that the student did not receive a prior Pell Grant overpayment.

The Department reports that as of February 6, 1997, NSLDS contained about 71 million open loan and grant records from guaranty agencies (FFELP), direct loan servicers (FDLP), and schools (campus-based, i.e., Perkins and the Pell program). As figure 1 illustrates, a significant portion of data stored in NSLDS—about 70 percent—relates to FFELP guaranteed loans.

Figure 1: Approximate Number and Percentage of Open Loan and Grant Records in NSLDS by Program, as of February 6, 1997



Source: Department of Education.

To help federal agencies better manage information systems projects such as NSLDS, the Congress recently enacted the Clinger-Cohen Act of 1996.[6] In response to the act's mandates, the Department of Education has established the position of chief information officer (CIO). While day-to-day management of student financial aid information systems resides with the Office of Postsecondary Education, the CIO provides technical advice on the direction of the Department's information resources.

Education Has Made Limited Progress in Integrating NSLDS With Other Databases

In responding to the HEA amendments of 1992, the Department of Education implemented an approach that falls short of full integration. The Department opted to establish NSLDS as a data repository that would only receive and store information from other title IV systems. However, the lack of uniformity in how the systems handle their information—no common student or institutional identifiers or data standards—has complicated data matching between systems. Hence, NSLDS cannot effectively be updated without expensive conversion "workaround" programs.

[6]The Clinger-Cohen Act of 1996 (formerly known as the Information Technology Management Reform Act of 1996), P.L. 104-106, Division E.

Past Departmental studies, as well as those conducted by the Advisory Committee on Student Financial Assistance,[7] have consistently addressed the need for integration[8] of student financial aid databases, citing reduced management efficiency, compromised system integrity, and escalating costs as resulting from the lack of integration. The benefits of integration are many, and include such areas as improved quality through reduced development changes, streamlined operations, formalized communications, and cost reductions through increased productivity and decreased data redundancy. The National Institute of Standards and Technology measures the effectiveness of integration by assessing "whether a user can get the right data, at the right place, at the right time, in the right form, and at the right cost."[9]

In recognition of the need for integration to address long-standing problems and improve the availability and quality of data on title IV program participants, the 1992 HEA amendments required that the Department, by January 1, 1994, integrate NSLDS with other databases containing information on student financial aid program participants. To assist in achieving this integration, the amendments also required the Department to (1) establish common identifiers so that codes used to identify institutions and students were consistent across programs, and (2) standardize data reporting formats, including definitions of terms, to permit the direct comparison of data.

Department's Approach Falls Short of Integration

In response to the HEA amendments, the Department, through a contractor, designed and implemented NSLDS to receive and store student financial aid data from title IV programs in one central database. At the same time, the Department maintains multiple internal program-specific systems, many of which individually store the same data for their respective title IV programs. Under this approach, each system would periodically supply NSLDS with data from each of its respective title IV programs.

[7]The Congress created the Advisory Committee on Student Financial Assistance when it enacted the HEA amendments of 1986. The Advisory Committee serves as an independent public advisory committee to the Department of Education and the Congress.

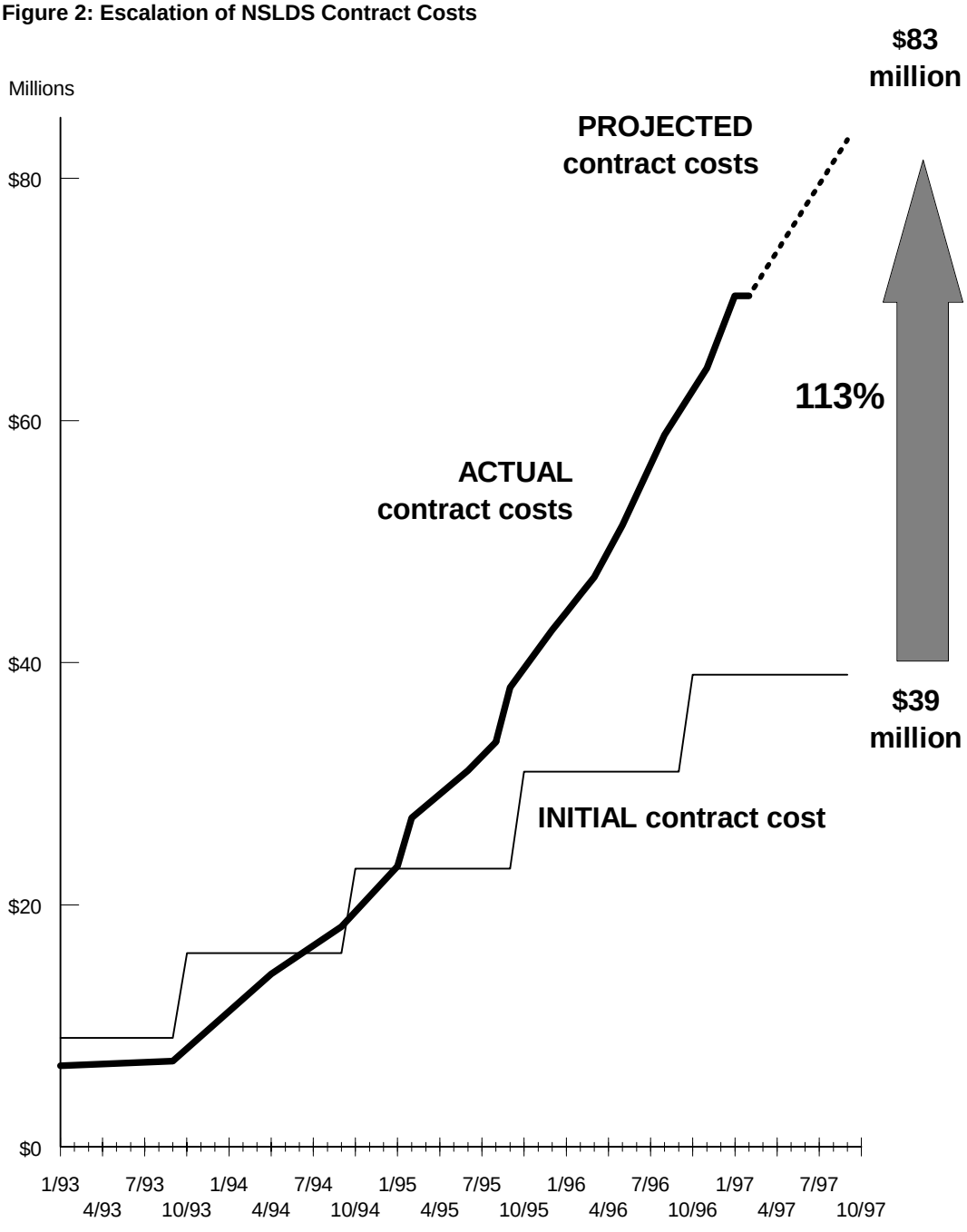
[8]Information *integration* is defined by the National Institute of Standards and Technology as establishment of the appropriate computer hardware/software, methodology, and organizational environment to provide a unified and shared information management capability for a complex business enterprise (Information Management Directions: The Information Challenge, special publication 500-167, September 1989).

[9]Special publication 500-167, September 1989.

The Department's implementation of this approach has not achieved full integration because it has not created a seamless information exchange environment that would allow for a complete, accurate, real-time student financial aid record. Preventing this is the fact that most of the title IV systems and NSLDS are not readily compatible—they cannot easily communicate with each other. These systems, operated by several different contractors, have a variety of architectural characteristics, including different types of hardware, operating systems, application languages, and database management systems. In addition to the Department's internal systems, thousands of schools or their agents, and the numerous guaranty agencies, also use disparate systems to send data to NSLDS.

With these differing architectural characteristics, accommodations must be made through the use of computer programs to bridge the gap between NSLDS and the other data providers' systems by converting data into mutually recognizable formats. For example, in order for most of the Department's major systems to send information to NSLDS, each data provider must first develop and execute software to extract data from its respective databases. The data must then be processed by complex formatting, editing, and error correction programs specifically designed for each data provider type before NSLDS can be updated. Developing and maintaining these programs is work that may itself introduce errors and would not be required in a fully integrated environment. Education and its data providers have over 300 data formatting and editing programs that are subject to potential modification as new requirements are identified. This has contributed to escalation in the estimated cost of the 5-year contract for NSLDS—from the original $39 million estimate to now about $83 million. Figure 2 shows the increase in estimated costs.

Figure 2: Escalation of NSLDS Contract Costs



Source: Department of Education.

Department officials acknowledge that integrating NSLDS and other title IV systems has not been fully achieved. They believe, however, that given the complexities of the title IV environment and statutory requirements, they had little time to consider viable alternatives in designing and implementing NSLDS.

Common Identifiers Have Not Been Established

The use of common identifiers or data naming conventions across systems is well established as an aid to data sharing and understandability. However, the Department has not fully implemented the use of common identifiers for students and institutions, as required by law. This lack of common identifiers makes it difficult to track students across programs. All applicants for federal student aid are required by law to provide their Social Security numbers, which the Department considers its common student identifier. Yet positive identification of student records across systems is still a cumbersome process because each system requires additional and often different data fields beyond the Social Security number to access records. For example, to identify, access, and update a specific student record, systems use inconsistent combinations of various data elements, such as date of birth and the first two to three letters of either the first or last name.

Identifying institutions can also be problematic because multiple identifiers are often used. For example, institutions may be assigned different identification numbers for each title IV program in which its students participate. Despite the 1992 HEA amendments' requirement for common institutional identifiers by July 1, 1993, current Department plans do not call for the development and implementation of such common identifiers until the 1999-2000 academic year.

Lack of Title IV Data Standards Complicates Data Matching

Data standards are used to govern the conventions for identifying, naming, and formatting data. Having such standards in place helps ensure that the data being collected and maintained within an organization are structured and stored so as to be accessible, understandable, and comparable —meaning the exact same thing—to everyone in the organization.

Although the 1992 HEA amendments required Education to establish standard reporting formats and data definitions, the Department has only partially done so. Specifically, the Department has not established a common data dictionary for its title IV programs. Instead, while each program and supporting system uses the reporting formats specified for

NSLDS, the Department permits each program to use its own data dictionary[10] for its own system. One example of how the lack of data standards can affect program operations can be seen in the differences in how student enrollment status is stored in NSLDS, compared with how it is stored in the system that supports the Pell Grant program. Properly determining enrollment status is important because students generally begin repaying loans following a 6-month grace period after leaving school. Because NSLDS and the Pell system report enrollment status in different formats—alpha versus numeric—and use different definitions, exact comparisons cannot be made and queries may well produce inconsistent responses; this can lead to misinterpretations of a student's true enrollment status. Problems such as these resulting from data inconsistencies between systems and NSLDS can take school officials weeks or months to resolve—if they are even detected.

Another example of inconsistencies linked to the lack of data standards involves conflicts in the acceptability of data formats between NSLDS and the software provided by the Department for data exchange.[11] While the NSLDS software accepts either past, present, or future dates, the exchange software's edits were designed to reject dates that have already passed—therefore not allowing a roster to be sent to NSLDS. This problem has made it difficult for schools to process students' enrollment status information or update NSLDS accurately. In order to process rosters for students with past graduation dates (e.g., graduate students), schools were instructed to insert fictitious future graduation dates in order to pass the exchange software edit. The Department has agreed to pay an additional $343,000 in NSLDS labor costs for temporary workaround software solutions to correct design conflicts between the exchange software and NSLDS.

The lack of data standards also contributes to problems with data quality and reliability. For example, several of the school officials we spoke with chose not to use the NSLDS electronic financial aid transcript function to obtain student financial aid history information on transfer students. These officials still request paper transcripts from the student's previous school(s) because they consider the electronic data unreliable.

[10]A data dictionary is a repository of information describing the characteristics of data used to design, monitor, document, protect, and control data in information systems and databases.

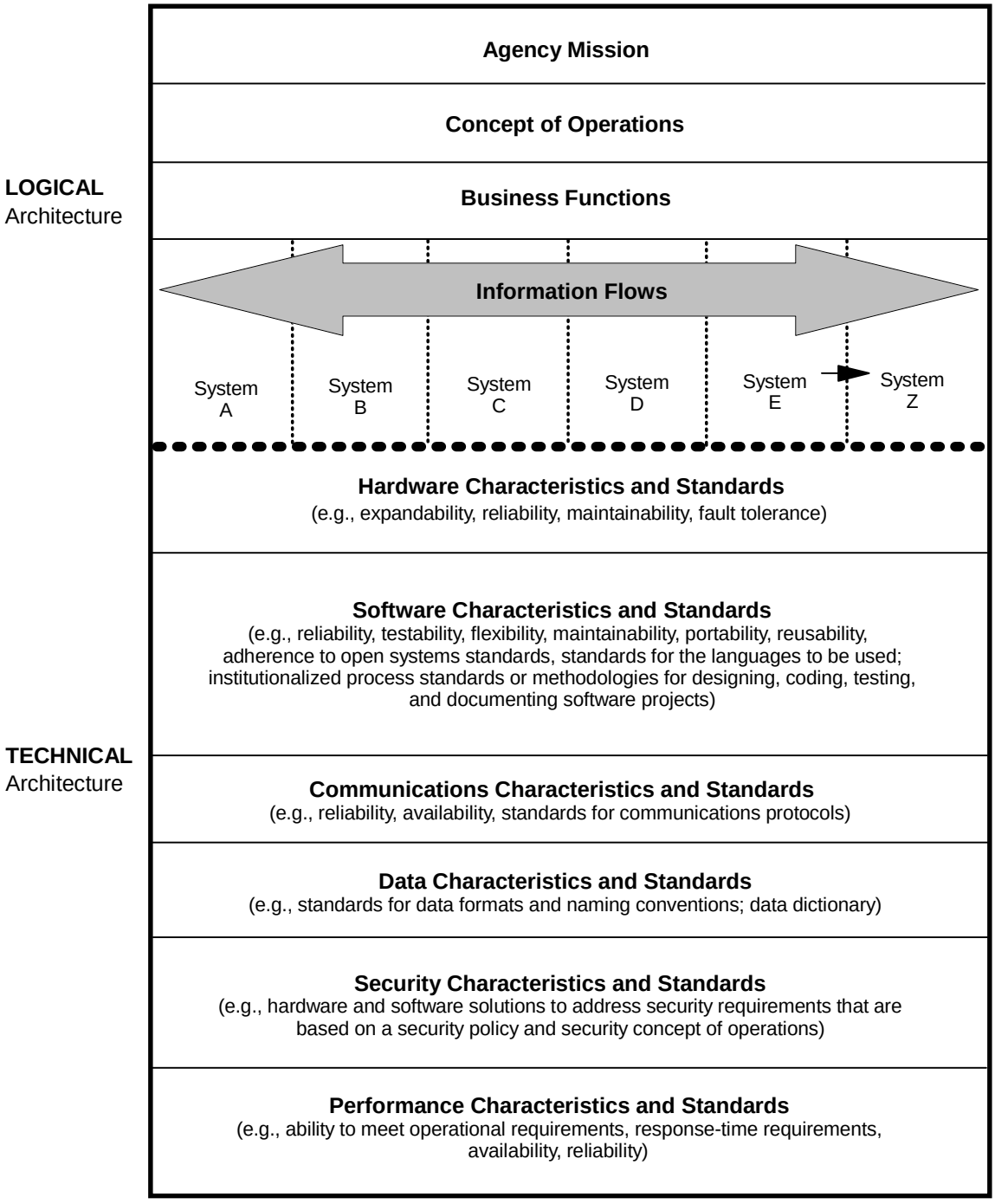
[11]This software, known as EDExpress, enables schools to initiate student aid applications and perform edits and corrections on applicant data, including student enrollment status. It links schools to communications software that provides access to NSLDS.

The Department has long recognized the significant problems with title IV data reliability. It has reported data unreliability as a material weakness under the Federal Managers' Financial Integrity Act. Plans are now underway to address this issue through a major project initiated last December to reconcile NSLDS data with data in the program-specific databases. This effort started with the guaranty agencies—the largest group of data providers in terms of loan volume. The Department then plans to reconcile data coming from its internal systems, then the schools that report Perkins loan data—all of which are also problematic. For example, the 2,700 schools that participate in the Perkins Loan Program are also required to provide data to NSLDS; however, not all schools yet do so—about 7 percent do not.

Systems Architecture Essential to Overcoming Lack of Integration

As computer-based information systems have become larger and more complex over the last 10 years, the importance of and reliance on what is called a systems architecture has correspondingly increased. Simply put, an architecture is the blueprint to guide and constrain the development and evolution of a collection of related systems. This is done first in logical terms, such as defining the organization's functions, providing high-level descriptions of its information systems and their interrelationships, and specifying how and where information flows. Second, this blueprint explains operations in technical terms, such as specifying hardware, software, data communications, security, and performance characteristics. Figure 3 displays the key logical and technical components of a systems architecture.

Figure 3: Key Logical and Technical Components of a Systems Architecture



A systems architecture is important because, in guiding and constraining a project's development or modernization, it can help significantly to avoid inconsistent system design and development decisions, and their concomitant increased costs and performance shortfalls. Leading public and private organizations are using systems architectures to guide mission-critical system acquisition, development, and maintenance. The Congress has also recognized the importance of such architectures in improving the effectiveness and efficiency of federal information systems. The Clinger-Cohen Act of 1996 requires, among other provisions, that Department-level CIOs develop, maintain, and facilitate the implementation of integrated systems architectures.[12]

Experts in academia have also championed the systems architecture approach. The Software Engineering Institute of Pittsburgh's Carnegie Mellon University includes the development and evolution of a systems architecture as a key process area in its Systems Engineering Capability Maturity Model.[13]

Implementation of a systems architecture within Education could dramatically help the Department overcome its continuing problems in integrating NSLDS and the other title IV systems. For example, at the logical level, the Department would get a clear picture of the factors contributing to "stovepipe" design which inhibits movement of information between systems. Then, at the technical level, reaching agreement on data characteristics and standards, including establishing a departmentwide data dictionary, would enable Education to ensure that aggregated data in NSLDS are presented uniformly. Further, since one of the purposes of the technical architecture is to ensure that systems are interoperable,[14] having such an architecture would reduce the continuing need for the Department to implement expensive workarounds.

Despite the importance of having a systems architecture, the Department of Education has not devoted the time or effort necessary to develop such a blueprint. According to OPE officials, several factors accounted for this, including the Department's focus on responding to legislative mandates, and its lack—until recently—of a CIO. The Department reports that work on a systems architecture has begun; the technical portion of it has been

[12]Section 5125.

[13]A Systems Engineering Capability Maturity Model,[SM] Version 1.1, Software Engineering Institute, Carnegie Mellon University (SECMM-95-01, CMU/SEI-95-MM-003, November 1995).

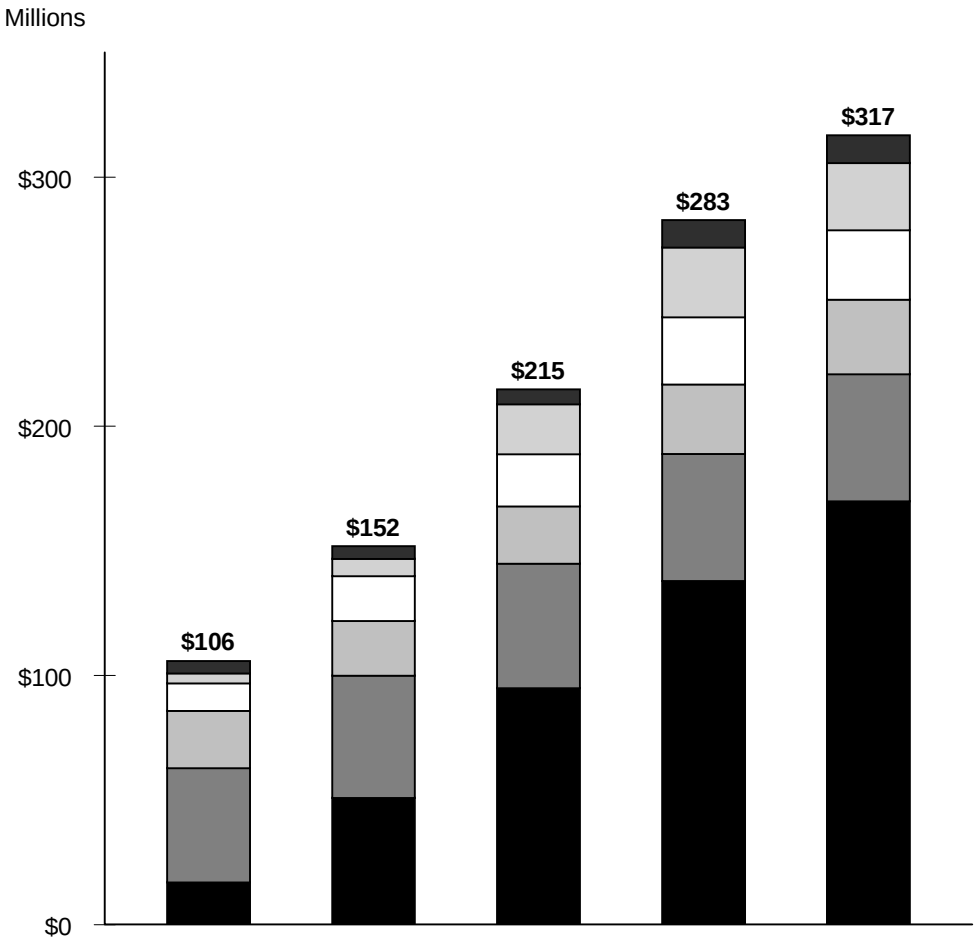
[14]Interoperability is the ability of disparate systems to work together efficiently and effectively over a network.

drafted, and the logical portion is planned for completion by June 30, 1998. Based on our preliminary review of the Department's draft architecture, it appears that Education is underestimating what is required to develop and implement a departmentwide systems architecture. For example, the complexity of the current computing environment will make it even more difficult to implement a standard systems architecture across the Department than what is described in the draft architecture. We also note that the technical component is being drafted before the logical is completed. The logical component should be developed first because it is derived from a strategic information systems planning process that clearly defines the organization's mission and concepts of operations. It then defines the business functions required to carry out the mission and the information needed to perform the functions.

Acquisition of Stand-Alone Systems Continues While Problems and Costs Mount

Despite the compelling need for a comprehensive systems architecture that would enable the eventual integration of title IV systems, the Department continues the practice of acquiring and maintaining multiple, independent stovepipe systems through the use of multiple contractors. The Department currently manages nine major systems, supported by 16 contracts, to administer student financial aid programs. Table 1 lists these systems. The systems range from legacy mainframes, several originally developed over 15 years ago, to a recently developed client-server system. Over the past 5 years the information technology budget has tripled, costing the Department over $1 billion. As illustrated in figure 4, the fiscal year 1994 actual costs to maintain these systems was $106 million, and is expected to climb to $317 million in fiscal year 1998. For the most part, these systems operate independently and cannot communicate or share data directly with one another.

Figure 4: Student Financial Aid Systems Costs From Fiscal Year 1994 Through Fiscal Year 1998



	FY 94 Actual	FY 95 Actual	FY 96 Actual	FY 97 Budget	FY 98 Budget (est)
FDLP	$17	$51	$95	$138	$170
CPS*	$46	$49	$50	$51	$51
FFELPS	$23	$22	$23	$28	$30
NSLDS**	$11	$18	$21	$27	$28
Misc Sys***	$4	$7	$20	$28	$27
PGRFMS	$5	$5	$6	$11	$11

* includes the multiple data entry systems (MDES)

** revised to reflect a more recent estimate (as of 6/97) for FY 98 Budget

***includes: TIVWAN, EASI, PEPS, and CBS

Source: Department of Education.

Table 1: Student Financial Aid Systems and Contractors

System	Acronym	Contractor
Campus-based System	CBS	Universal Automation Labs, Inc.
Central Processing System	CPS	National Computer Systems
Federal Direct Loan Program	FDLP	
— Loan Origination System		Computer Data Systems, Inc. (old) Electronic Data Systems (new)
— Loan Servicing Systems		Computer Data Systems, Inc. (old) Electronic Data Systems (new) Raytheon/E-Systems, Inc. (new) Education Loan Servicing Center, Inc. (new)
Federal Family Education Loan Program System[a]	FFELPS	Raytheon/E-Systems, Inc.
Multiple data-entry systems	MDES	INET and American College Testing
National Student Loan Data System	NSLDS	Raytheon/E-Systems, Inc.
Pell Grant Recipient and Financial Management System	PGRFMS	Planning Research Corp., Inc.
Postsecondary Education Participants System[b]	PEPS	Computer Business Machines, Inc. (new), and Madentech (old)
Project Easy Access for Students and Institutions[c]	EASI	Price Waterhouse
Title IV Wide Area Network	TIVWAN	National Computer Systems

[a]In support of the Federal Family Education Loan Program (FFELP), the Department maintains an internal system—FFELPS (Federal Family Education Loan Program System). This system is used to pay interest and claims to lenders and guaranty agencies, and to support collections on defaulted loans. FFELP is also supported by guaranty agency systems, whose costs are not included in the Department's ADP budget.

[b]PEPS is replacing the Institutional Data System.

[c]Project EASI is currently still in the developmental stage.

Source: Department of Education.

Many of Education's student financial aid systems, including NSLDS, were developed independently over time by multiple contractors in response to new functions, programs, or mandates, rather than as part of a long-range system design strategy. As a consequence, a de facto, highly heterogeneous systems environment has evolved that relies heavily on contractors to develop and maintain critical student financial aid systems whenever the need arises. In carrying out this strategy, the Department has established and maintained long-term arrangements with a limited number of contractors to develop and operate these systems. These

contractors operate the systems in their own disparate hardware and software environments.

A recent example of the complexities and risks inherent in the Department's stovepipe approach is the development of the systems that support FDLP. As part of its planned systems design, the Department now has multiple contractors performing various aspects of the direct lending process. The Department recently awarded separate contracts to three vendors for new stand-alone systems to service direct loans. In addition to its original servicer, the total cost of these four systems contracts is estimated to be at least $1.6 billion through fiscal year 2003. This will result in four different servicing systems for the same loan program, creating opportunities for problems stemming from a lack of system interoperability.

For many years, the Department has been advised that it should migrate away from its stovepipe approach. The Advisory Committee on Student Financial Assistance reported in March 1995, August 1995, June 1996, and again in May 1997, that deficiencies in the overall delivery system for student financial aid result from the lack of a fully functional, title IV-wide recipient database that could integrate all program operations.

The Department has stated that it recognizes the need for an integrated title IV systems environment. In fact, in 1995 the Department, under OPE's Office of Student Financial Assistance Programs, began an initiative known as Project EASI. This project was originally designed to focus on reengineering the Department's current processes and developing an integrated system that included all participants in the student financial aid community. However, as we reported in February 1997,[15] Project EASI has had a checkered past, has undergone a tentative start, and has been loosely defined. In addition, top management's commitment to the project has been uncertain. Accordingly, it is unclear whether the project will achieve its original goal of process redesign and systems integration.

Conclusions

The Department of Education continues its slow pace toward compliance with the 1992 HEA amendments to integrate its student financial aid information systems. Moreover, the Department will likely be unable to correct long-standing problems resulting from a lack of integration across its student financial aid systems until a sound systems architecture is established and effectively implemented. Further, unless this happens,

[15]GAO/HR-97-11, February 1997.

problems and maintenance costs with its nine separate information systems will probably escalate, as will the likelihood of acquiring new stand-alone systems.

Recommendations

Given the importance, cost, and magnitude of student financial aid and the information systems structure needed to support this aid, we recommend that the Secretary of Education direct the Department's chief information officer to

- develop and enforce a departmentwide systems architecture by June 30, 1998, that includes, but is not limited to (1) a high-level description of the organization's mission, functional requirements, information requirements, systems, and information flows among systems and (2) specific information technology and communications standards and approaches that address critical hardware, software, communications, data management, security, and performance characteristics; and
- ensure that the developed systems architecture addresses the title IV systems integration, common identifiers, and data standards deficiencies.

We also recommend that the Secretary of Education direct that as of July 1, 1998, the Department's information technology investments conform to the developed architecture and that funding for all projects be predicated on such conformance; unless careful, thorough, and documented analysis supports an exception.

Agency Comments and Our Evaluation

In its comments on a draft of this report, the Department of Education agreed with our recommendation to establish a departmentwide systems architecture within the next year. However, Education stated that our observation that the Department has made "limited progress" in integrating NSLDS with other title IV financial aid systems fails to consider the complexities that faced NSLDS developers and the funds saved. Indeed, it is the complexity of Education's systems environment that highlights the need for the systems architecture.

We believe the progress made by the Department in integrating its student financial aid systems is limited. Schools still often rely on paper documents to process financial aid loan applications, students do not have real-time access to their loan status information, and loan data are not reported to NSLDS in a prompt manner. Although progress has been made in identifying applicants who have previously defaulted and initial efforts

have been made to reconcile errors in NSLDS, the number of known errors in the system remains significantly high. Further, the limited ability to share data among systems has cost and efficiency consequences—both critical factors in systems integration decisions. Thus, the lack of integration results in lost opportunities to achieve programmatic savings.

In many ways, the Department's student financial aid delivery system is similar to functions performed by the banking industry, such as making loans, reporting account status, and collecting payments. In today's technological age, automated teller machines are commonplace and heterogeneous financial institutions can deduct funds from depositors' accounts anywhere in the world in seconds with a high degree of accuracy. Given this environment, the gap between the capabilities of the private sector and those of the Department of Education is quite apparent.

It does appear that the Department is beginning to recognize the need for an integrated title IV systems environment, as we stated in this report. We are encouraged by the initiatives outlined in the agency's response aimed at improving the operations of such a complex heterogeneous systems environment. Coordination and continued emphasis by top management of these far-reaching initiatives will be essential to ensure their success. Our evaluation of the Department's comments and their full text are reprinted as appendix II.

We are sending copies of this report to the Secretary of Education, the Director of the Office of Management and Budget, appropriate congressional committees, and other interested parties. Copies will also be made available to others upon request. Please contact me at (202) 512-6253 or by e-mail at *willemssenj.aimd@gao.gov* if you have any questions concerning this report. Major contributors to the report are listed in appendix III.

Joel C. Willemssen
Director, Information Resources Management

Contents

Abbreviations

ADP	automated data processing
CBS	Campus-based System
CIO	chief information officer
CPS	Central Processing System
EASI	Easy Access for Students and Institutions
FDLP	Federal Direct Loan Program
FFELP[S]	Federal Family Education Loan Program [System]
HEA	Higher Education Act
HR	high risk
IDS	Institutional Data System
MDES	multiple data-entry systems
NSLDS	National Student Loan Data System
OIG	Office of Inspector General
OPE	Office of Postsecondary Education
PEPS	Postsecondary Education Participants System
PGRFMS	Pell Grant Recipient and Financial Management System
TIVWAN	Title IV Wide Area Network

Objective, Scope, and Methodology

Integrating NSLDS with other title IV databases was mandated by the Congress in 1992 in section 485B(g) of the Higher Education Act of 1965, as amended. Our objective was to assess the Department's progress toward integrating NSLDS with other student financial aid systems. To achieve our objective we examined NSLDS' history, contract, and technical documentation related to the title IV systems. In addition to examining records, in order to gain a better understanding of the title IV environment, we conducted interviews with Department officials responsible for title IV systems integration, contract employees responsible for NSLDS development and operations, and members of the education community affected by NSLDS.

To research NSLDS history, we examined sections of the 1986, 1989, and 1992 amendments to the Higher Education Act. We analyzed those sections related to the creation of NSLDS and its intended functionality. In addition, we reviewed prior GAO, OIG, and Department of Education internal reports showing deficiencies in title IV programs and the need for an integrated title IV database.

We examined NSLDS contract files, and reviewed the original request for proposals, statement of work, task orders through May 1997, and contract amendments. In addition, we discussed the NSLDS contracting process with officials from the Department's chief financial officer's office.

The technical documentation we reviewed on the title IV systems included data dictionaries from the major systems, NSLDS program code and program manuals, and FDLP and FFELPs software programs, which convert data from their respective databases into a format suitable for input into NSLDS. To determine the number of programs used in the NSLDS update process, we requested that Raytheon/E-Systems—the responsible contractor—provide all programs used to update the NSLDS database. Using a code analyzer developed by pi Technologies Group, we scanned the NSLDS code to quantify the number of programs, lines of code, and integration interoperability with other systems.

To assess the Department's actions to integrate NSLDS, we identified the organizational components involved in developing and operating NSLDS. We interviewed numerous officials from the Department's Office of Postsecondary Education, including the director of the program systems service and the director of the NSLDS division.

To assess NSLDS' current operations we interviewed staff from Raytheon/E-Systems. We discussed the methods by which information is transmitted into NSLDS, and how users gain access to this information.

To assess the education community's perspectives on NSLDS and its usefulness, we visited and interviewed officials from the Advisory Committee on Student Financial Assistance, the National Student Loan Clearinghouse, the National Council of Higher Education Loan Programs, Inc.; and financial aid officials from four state colleges, two universities, two community colleges, and one private college. The schools were selected from a list of NSLDS schools and contacts provided by the NSLDS contractor.

We performed our work at Department of Education headquarters in Washington, D.C. We visited schools in Washington, D.C., Virginia, and Maryland. Our work was performed from November 1996 through June 1997 in accordance with generally accepted government auditing standards. The Department of Education provided written comments on a draft of this report, which are included as appendix II.

Comments From the Department of Education

Note: GAO comments supplementing those in the report text appear at the end of this appendix.

UNITED STATES DEPARTMENT OF EDUCATION

WASHINGTON, D.C. 20202-

JUL 21 1997

Mr. Joel C. Willemssen
Director
Information Resources Management
United States General Accounting Office
Washington, D.C. 20548

Dear Mr. Joel C. Willemssen:

Thank you for the opportunity to respond to your draft report entitled "Systems Architecture Needed to Improve Program Efficiency" (GAO/AIMD-97-122). You have already received our more specific comments under separate cover.

While we are in agreement with the report's recommendation to establish a Department-wide systems architecture within the next year, we would like to address some of the statements regarding development and management of the National Student Loan Data System (NSLDS) in the body of the report.

See comment 1.

The Department is currently working collaboratively with the financial aid community through Project EASI to integrate and improve the financial aid delivery systems, including the establishment of a common architecture and standard reporting formats. The Secretary of Education is in full support of this project, and the initiative has the encouragement and participation of the Office of the Chief Information Officer. As part of our implementation of the Clinger-Cohen Act of 1996, we have established an Information Technology Investment Review Board which will ensure that information initiatives and capital investments are in concert across the Department.

See comment 2.

We believe that the observation that ED has made "limited progress" in integrating the NSLDS with other Title IV financial aid data systems fails to consider complexities that faced the NSLDS developers. The primary focus of the NSLDS design, in direct response to the statutory requirement, was to gather and record data from guaranty agencies and schools--a large number of diverse organizations and systems, each with its own missions and objectives. The report correctly observes that there is lack of uniformity in the data providers' disparate systems, but then criticizes NSLDS for the use of "workaround" programs. We believe that the use of workarounds shouldn't be described as a problem, but as a reflection of the complex heterogeneity of the environment. If standard formats had existed among guaranty agencies and educational institutions, the development and maintenance of NSLDS would have been considerably simpler.

See comment 3.

As a short-term solution to evolve from the stovepipe structure of our current systems, the Office of Postsecondary Education has proposed contracting by function rather than by program. This initiative is intended both as a cost-saving device and as a means to leverage the skills of the marketplace better. We informally shared this plan with the GAO evaluation team, and were encouraged by their feedback. NSLDS will pioneer the migration to this method this fall.

See comment 4.

While the report describes the cost of the system so far ($83 million), it does not take into account the increased use of the system nor the substantial savings that have been achieved by using NSLDS to deny aid applicants further assistance if they have defaulted on previous student loans, have not resolved grant overpayments, or have reached the statutory limits on

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See comment 5.

how much they can borrow. Last year we advised GAO that the prescreening data matches identified approximately 125,000 prior defaulters among students applying for additional financial aid, possibly preventing as much as $310 million in future defaults and denying about $75 million in Pell grants to ineligible students. We are updating our computation of potential savings resulting from the NSLDS prescreening data matches and expect those numbers to be significantly higher. We would also like to point out that the report shows the estimated budget for NSLDS for FY98 as $32 million. This figure was revised to $28 million in June, which is only $1 million over the FY97 actual costs.

We are proud of our accomplishments in implementing NSLDS. We will continue our efforts to integrate the student aid systems though standardized data, communication, and architecture. Again, we appreciate the opportunity to comment on the draft report. If you have any questions about our comments, please do not hesitate to contact us.

Sincerely,

Donald Rappaport
Chief Financial Officer/
Chief Information Officer

David A. Longanecker
Assistant Secretary for
Postsecondary Education

The following are GAO's comments on the letter from the Department of Education dated July 21, 1997.

GAO Comments

1. We are encouraged by the Department's statement that the Secretary is in full support of Project EASI. However, given the project's problems to date, it is unclear whether Project EASI will achieve its original goal of title IV process redesign and systems integration. As we stated in our report, implementation of a systems architecture within Education could dramatically help the Department overcome its continuing problems in integrating its title IV systems.

2. In our report, we recognize the complexity of the heterogeneous systems environment that supports student financial aid delivery. As noted, this environment has been a major factor impeding progress in integrating NSLDS and other title IV systems. Accordingly, a systems architecture is needed to guide future systems development.

3. While we view OPE's short-term proposal to contract by function rather than by program as a positive step towards improving the operation of Education's title IV information systems, we are concerned about the long-term capability of the Department to develop, implement, and enforce a departmental systems architecture which encompasses the diverse needs of title IV systems. In finalizing this draft architecture, the Department should ensure that it meets the requirements of the Clinger-Cohen Act of 1996 which mandates Department-level chief information officers to develop, maintain, and facilitate the implementation of integrated systems architectures. The Department should also ensure that the departmentwide systems architecture addresses the recommendations contained in this report.

4. Conducting an assessment on the benefits of NSLDS or validating the accuracy of the reported savings was not within the scope of work for this report. However, in our recent high risk report,[1] we did cite NSLDS benefits as reported by the Deputy Secretary of Education.

5. We revised the report to reflect the Department's most recent estimate of the NSLDS budget.

[1]GAO/HR-97-11.

Major Contributors to This Report

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Related GAO Products

Department of Education: Multiple, Nonintegrated Systems Hamper Management of Student Financial Aid Programs (GAO/T-HEHS/AIMD-97-132, May 15, 1997).

High-Risk Series: Student Financial Aid (GAO/HR-97-11, Feb. 1997).

Reporting of Student Loan Enrollment Status (GAO/HEHS-97-44R, Feb. 6, 1997).

Department of Education: Status of Actions To Improve the Management of Student Financial Aid (GAO/HEHS-96-143, July 12, 1996).

Student Financial Aid: Data Not Fully Utilized To Identify Inappropriately Awarded Loans and Grants (GAO/T-HEHS-95-199, July 12, 1995).

Student Financial Aid: Data Not Fully Utilized to Identify Inappropriately Awarded Loans and Grants (GAO/HEHS-95-89, July 11, 1995).

Federal Family Education Loan Information System: Weak Computer Controls Increase Risk of Unauthorized Access to Sensitive Data (GAO/AIMD-95-117, June 12, 1995).

Financial Audit: Federal Family Education Loan Program's Financial Statements for Fiscal Years 1993 and 1992 (GAO/AIMD-94-131, June 30, 1994).

Financial Management: Education's Student Loan Program Controls Over Lenders Need Improvement (GAO/AIMD-93-33, Sept. 9, 1993).

Financial Audit: Guaranteed Student Loan Program's Internal Controls and Structure Need Improvement (GAO/AFMD-93-20, March 16, 1993).

Department of Education: Management Commitment Needed To Improve Information Resources Management (GAO/IMTEC-92-17, April 20, 1992).

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